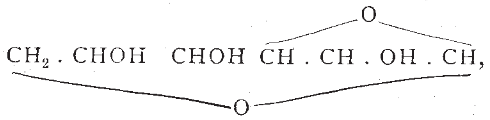
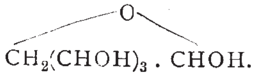
gums and mucilages as yield various glucoses, and sometimes also arabinine, as products of hydrolytic resolution (gum-arabic, cerasin, bassorin, "wood gum"). Ascending in the scale of molecular complexity, the celluloses are next described; and lastly, in separate sub-sections, lignin, cork, and pectic derivatives. We have been interested in comparing the author's account of the latter group with those given under "Celluloses" in the new edition of Watts's "Dictionary." There is a close agreement in general method of treatment; and it is satisfactory to find that the problem of the constitution of the celluloses is being worked on such lines as would be laid down from a study of the general view of the carbohydrates which Prof. Tollens has given us. Neither of these acounts of cellulose suggests any probable constitutional formula for the unit group of which the celluloses may be regarded as poly-derivatives; but, putting the views of both authors together, we arrive at the following—



$$\mathrm{CH_2 . CHOH \quad CHOH \quad CH . CH . OH . CH},$$

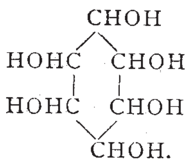
which we think will at least be found of service as a working hypothesis. In the section "Lignin," Prof. Tollens has overlooked some of the researches of recent years, which have, as the result of investigations of its hydrolysis and chlorination, more definitely identified the non-cellulose constituent of lignified tissue with a furfuralic constitution on the one side, and the tendency to an aromatic grouping on the other. In the section "Cork," he has also overlooked some of Fremy's interesting work on the constitution of "cuticular" substances The concluding section of the saccharocolloids comprises the pectic group of plant constituents, which are briefly but fully described.

The fourth section opens with an account of *arabinose*, which the author represents by the constitutional formula—



$$\mathrm{CH_2(CHOH)_3 . CHOH.}$$

Formose, or polymerized formaldehyde, is not regarded as a true glucose. Carius's *phenose* is described; the evidence as to its composition, however, is very slender. The writer has, moreover, devoted some time to a repetition of Carius's research, but failed to obtain any product such as that described. *Inosite* is represented on the basis of Maquenne's researches, by the symmetrical formula—



Dambonite and *bornesite*, which are found in caoutchouc-yielding juices, are described as the mono- and di-methyl ethers of inosite, respectively.

The fifth section comprises the hexahydric alcohol mannite and its isomerides, dulcite, sorbite, and perseite, of which the typical mannite is fully described.

The second part of the work gives a detailed account of "substances closely related to the carbohydrates, and obtained for the most part from them, which are either acids or acid-anhydrides (lactones), and the molecule of which contains 6 C-atoms": (*a*) saccharinic acid, $C_6H_{12}O_6$, and its isomerides, iso- and *meta*-saccharinic acids, their lactone-anhydrides, $C_6H_{10}O_5$, "*saccharines*," and their oxy-derivatives, *saccharones*, $C_6H_8O_6$; (*b*) gluconic acid, $C_6H_{12}O_7$, and its isomerides, galactonic and arabinose carbonic and mannitic acids; saccharic acid, $C_6H_{10}O_8$, and its isomerides, mucic, iso-, meta-, and para-saccharic acids, with their lactonic and other derivatives.

Such is a brief account of the contents of the book before us. The main purpose is necessarily the theoretical treatment of the subject—from the point of view, that is, of pure chemistry; at the same time due prominence is given to technical considerations, and the physiological aspects of the subject are by no means excluded.

We do not believe that we are yet within measurable distance of a knowledge of the actual molecular constitution of the carbohydrates. We do not even think that the evidence for the C_6 formulæ of the simplest members is at all conclusive. One of the assumed criteria of this point—the calculation of molecular weight from the lowering of the freezing-point of solvents by the presence of compounds in solution, as proposed by Raoult—is not mentioned by Prof. Tollens. At a recent meeting of the Chemical Society, Messrs. Brown and Morris communicated the results of an investigation of the freezing-point of solutions of the simpler carbohydrates, which appear to confirm the generally accepted views. Nevertheless, it would be premature to pronounce at all positively, either as to this particular criterion, or as to the evidence generally on these points.

The chemistry of the carbohydrates brings us into contact with the syntheses and transformations of the organic world. The plant is, and will remain through all time, the chemist's ideal. Every contribution to the chemistry of the carbohydrates is a step towards a comprehension of the chemistry of elaboration. The number of workers in the field is relatively small, but will increase as the methods of investigation are rendered more precise. It is from this point of view that we commend this little work to the notice of all who have either a special or general interest in plant-chemistry.

BRITISH MOSSES.

British Mosses. By F. E. Tripp. 2 Vols. New Edition. (London: George Bell and Sons, 1888.)

THE fact that a new edition of this work has been called for shows that these elegant plants have a wide-spread circle of admirers, and that there are many seekers after a knowledge of their structure.

The introduction occupies thirty-eight pages. In Sect. 1, on the homes of mosses, we have a highly poetical description of the third day of Creation, and production of vegetation according to Genesis. This is followed by the natural distribution and habits of the mosses; and by charming word-pictures of woods and moorlands the authoress compels her readers to accompany her and see for themselves the beauties that await observation on every side and at every season.

Sect. 2, the characteristics of mosses, is written in

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somewhat the same poetic strain, and glances at the leading aspects of mosses in natural scenery. Sect. 3, structure of mosses, gives a clear and succinct outline of the various organs of these plants, and their functions. Sects. 4 and 5, collecting and examining mosses, and uses of mosses, are the best in the book, and show the devotion of the writer to the study of this branch of botany. Then follows a synopsis of genera after Schimper's "Syn. Musc. Eur.," and at p. 45 we arrive at the description of species and plates, to which the remainder of the work is devoted.

The descriptions are all on one uniform plan, very short and under five heads--colour, stems, leaves, capsule, locality. The text is therefore somewhat monotonous and dry, while the essential points characteristic of the species are not always brought out; *e.g.* the Bryinæ are "Plants cellular, germinating from spores, with stems and leaves; fruit a capsule," which applies equally well to the Hepaticæ. With species this want of definiteness in description is apt to lead altogether astray. In other instances an erroneous term is introduced; thus *Trichostomum nitidum* is stated to have leaves "hairy at apex," *T. litorale* leaves "with short hair-points," whereas both have solid conical points, formed by the nerve.

The cell-structure of the leaves is a most important character, and is requisite both in descriptions and illustrations, but is not treated sufficiently in either. The 37 plates represent the plants of the natural size, and are very well coloured, so that the larger species may be readily recognized; but the leaves are not sufficiently magnified nor their structure sufficiently defined to render them sure guides, for the smaller species are too much alike, and the smallest of all, represented on Plate 5, it would puzzle any bryologist to discriminate.

Although for these reasons the work is not so helpful to the student as it might be, it forms an elegant table book. The paper is excellent, and the clear symmetric printing could hardly be surpassed.

OUR BOOK SHELF.

Catalogue of the Marsupialia and Monotremata in the Collection of the British Museum (Natural History). By Oldfield Thomas. (London: Printed by order of the Trustees, 1888.)

THIS is one of the new series of Zoological Catalogues of the British Museum, which, from their containing descriptions of all the known species of the group catalogued, form handy and excellent hand-books for the student, and serve for much more than records of the treasures of our British Museum.

This volume contains the descriptions of 151 species of Marsupials and 3 of Monotremes, in addition to descriptions of 12 well-marked varieties of the former and 2 of the latter order. Of this large total of 168, only 20 are not represented in the British Museum collection. The specimens amount to 1304 in all, of which 173 are preserved in spirits.

This is a very marked increase above the number in the list published in 1843, in which but 94 species were enumerated. Apart from the number of species represented in the collection, the value of these is greatly increased when they are "type" forms. In such forms, the British Museum is extremely rich, possessing 74, followed by the Paris Museum with 21, and then, at a long distance, by the Museums of Sydney and Leyden, with 8 each. In this Catalogue, probably for the first time, a double synopsis of each genus and species is given, in order to enable the student to identify a specimen either from its external characters, or from its skull alone. In order to make these latter synopses useful, explanations of the nomenclature and of the measurements are given.

The synonymy of the genera and species is worked out in very great detail, and in the case of the Monotremes we have in addition references to the literature bearing on the anatomy, embryology, &c., of the forms belonging to the order.

Although most of the species of Marsupials have been named within the last hundred years, and the greater number of them have names of quite recent date, yet the hasty descriptions of some authors have added much to the list of synonyms. In addition to the ordinary synonymy, Mr. Thomas has in most instances given references to the more important papers on the anatomy of the forms. These references make this Catalogue useful to the comparative anatomist as well as to the zoologist. To make such a list perfect would require much space, but, so far as we can judge, all the more important papers have been referred to; under *Phascolarctus cinereus*, we would add one on its anatomy by Prof. Macalister, in the *Ann. and Mag. Nat. Hist.*, 1872, vol. x., and one on the occurrence of a premaxilla-frontal suture in the skull, by Prof. Mackintosh (Proc. Roy. Irish Acad., n. s., vol. iii.).

We hope the day is not far distant when all the mammals in the British Museum collection will be catalogued in an equally accurate and effective manner.

Report of the Proceedings of the United States Expedition to Lady Franklin Bay, Grinnell Land. By Adolphus W. Greely. Vol. I. (Washington: Government Printing Office, 1888.)

EVERYONE knows, at least in its main outlines, the story of the Polar Expedition commanded by Lieut. Greely. Three years ago (NATURE, vol. xxxiii. p. 481) we reviewed the work in which he presented an interesting popular account of his experiences. The present volume contains the official Report, dated Washington, June 30, 1885, which Lieut. Greely addressed to the Chief Signal Officer of the United States army; and a singularly fascinating Report it is—all the more fascinating as no attempt is made to set forth the facts in a lively or picturesque style. The writer is so completely occupied with the events he records that he seems to have neither time nor inclination for any thought about the manner in which they should be presented. As appendices to the Report an immense number of documents relating to the Expedition are printed; and many of these are of considerable value, not only supporting the statements of the Report, but adding details which give freshness to the central narrative. The volume is enriched by an abundant supply of excellent full-page illustrations, illustrations grouped in plates, illustrations in the text, and maps and charts.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Origin of Coral Islands.

MR. MURRAY'S concise explanation of the formation of coral reefs and islands presents advantages in more than one respect. It demands no *a priori* assumptions, but begins and ends with that which can be observed, while Darwin's theory requires the preliminary concession of subsidence, which never has been and never

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